

EdiPower® II HM Series Datasheet



Features :

- LED light engine
- High power operation
- Instant on
- Long lifetime

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General Information

Introduction

The EdiPower® II HM series is based on the mirror-like MCPCB which features excellent reflectivity and luminous efficacy. The high performance COB products can be applied in many fields such as LEDs light bulb, down lights, track lights, residential lighting and commercial lighting fixtures.

Ordering Code Format

<u>2</u>	<u>P</u>	<u>HM</u>	<u>xx</u>	<u>xW</u>	<u>xx</u>	<u>P 1 x</u>	<u>xxx</u>		
X1	X2	X3	X4	X5	X6	X7	X8		
X1	X2	X3	X4	X5					
Type	Component	Series	Wattage	Color					
2	Emitter	P	EdiPower®	HM	HM Series	05	5W	CW	Cool White
						09	9W	NW	Neutral White
						16	16W	WW	Warm White
						30	30W		
						40	40W		
X6	X7	X8							
Internal code	PCB Board	Serial Number							
-	-	P12	13x13	-	-				
		P13	19x19						
		P16	28x28						



Average Lumen Maintenance Characteristics

Lumen maintenance for light sources or luminaires is defined in terms of the change in light output of a light source over operational life, relative to initially measured light output. Edison Opto projects that EdiPower® II HM Series products will deliver, on average, greater than 70% lumen maintenance (L70) after 50,000 hours of operation at the rated forward test current. This performance is based on constant current operation with case temperature maintained at or below 85°C.

These projections are based on a combination of package test data, semiconductor chip reliability data, a fundamental understanding of package related degradation mechanisms, and performance observed from products installed in the field using Edison Opto die technology. Observation of design limits in this datasheet is required in order to achieve this projected lumen maintenance.



Limited Warranty for Edison Opto EdiPower® II HM Series

This limited warranty is provided by Edison Opto to the original purchaser of the LED lighting product that is identified on our invoice reflecting its original purchase (the "Product"). We warrant that the Product, under normal operation ($T_p < 80^{\circ}\text{C}$ $T_j < 150^{\circ}\text{C}$ and the operation current is lower than maximum forward current which is described in the datasheet), will be free of defects in material and workmanship for a period of **FIVE (5) YEARS** from the date of original purchase.

Notes:

1. This limited warranty cannot be transferred to subsequent purchasers of the Product; even Product is resold in new condition and in its original packaging.
2. The determination of whether the Product is defective shall be made by Edison Opto in our sole discretion with consideration given to the overall performance of the Product.

Absolute Maximum Ratings (T_j=25°C)

Parameter	Symbol	Value	Units
DC Forward Current ¹	I _F	2PHM05xWxxP12xxx : 120 2PHM09xWxxP12xxx : 240 2PHM16xWxxP13xxx : 360 2PHM30xWxxP13xxx : 720 2PHM40xWxxP16xxx : 1,080	mA
Max Forward Current	I _F	2PHM05xWxxP12xxx : 240 2PHM09xWxxP12xxx : 480 2PHM16xWxxP13xxx : 720 2PHM30xWxxP13xxx : 1,440 2PHM40xWxxP16xxx : 2,160	mA
Reverse Voltage ²	V _R	Note 2	V
LED junction Temperature ³	T _J	150	°C
Operating Temperature	-	-40 ~ +110	°C
Storage Temperature	-	-40 ~ +120	°C
ESD Sensitivity (HBM)	V _B	2,000	V
Isolation Voltage	-	1,000	V
Thermal Measurement Point (T _p)	-	<80	°C

Notes:

1. DC forward current should not exceed LED's operating current; the current tolerance should be kept within a range of 5%.
2. LEDs are not designed to be driven in reverse bias.
3. Proper current derating must be observed to maintain junction temperature below the maximum at all time.

Characteristics

Parameter	Symbol	Value	Units
Viewing Angle (Typ.)	2θ _{1/2}	105~120	Degree
Forward voltage	V _F	36~38.4	V
CCT	-	CW : 5,000-10,000 NW : 3,800-5,000 WW : 2,670-3,800	K
Thermal resistance (Typ.)	Rθ _{J-B}	2PHM05xWxxP12xxx : 3.7 2PHM09xWxxP12xxx : 2.1 2PHM16xWxxP13xxx : 1.4 2PHM30xWxxP13xxx : 0.8 2PHM40xWxxP16xxx : 0.6	°C/W
ΔV _F /ΔT (Typ.)	-	2PHM05xWxxP12xxx : -12 to -20 2PHM09xWxxP12xxx : -10 to -18 2PHM16xWxxP13xxx : -8 to -14 2PHM30xWxxP13xxx : -6 to -12 2PHM40xWxxP16xxx : -4 to -10	mV/°C
CRI	-	80	-

Notes:

1. 2θ_{1/2} is the off-axis angle where the luminous intensity is half of the axial luminous intensity.
2. CCT is measured with an accuracy of ± 5%.
3. Wavelength is measured with an accuracy of ± 0.5nm.
4. Color rendering index CRI Tolerance : ± 2.

Luminous Flux Characteristic

Luminous Flux Characteristics $T_j=25^{\circ}\text{C}$

Wattage (W)	Color	Typ. Luminous Flux(lm) $T_j=85^{\circ}\text{C}$	Typ. Luminous Flux(lm) $T_j=25^{\circ}\text{C}$	Typ. Forward Voltage V_f (V)	Forward Current (mA)	Order Code
5-10W	2700K	430	490	37.2	120	2PHM05WW27P12001
		770	880	40.3	240	
	3000K	445	510	37.2	120	
		805	925	40.3	240	
	3500K	445	510	37.2	120	2PHM05NW27P12001
		805	925	40.3	240	
	4000K	455	520	37.2	120	
		820	940	40.3	240	
	5000K	460	525	37.2	120	2PHM05CW27P12001
		825	945	40.3	240	
	5700K	465	530	37.2	120	
		825	945	40.3	240	
9-20W	2700K	835	960	37.2	240	2PHM09WW27P12001
		1350	1550	40.3	480	
	3000K	865	990	37.2	240	
		1395	1600	40.3	480	
	3500K	880	1010	37.2	240	2PHM09NW27P12001
		1500	1720	40.3	480	
	4000K	900	1030	37.2	240	
		1550	1780	40.3	480	
	5000K	890	1020	37.2	240	2PHM09CW27P12001
		1525	1750	40.3	480	
	5700K	880	1010	37.2	240	
		1500	1720	40.3	480	
	6500K	885	1015	37.2	240	
		1505	1730	40.3	480	

Notes:

1. Forward Voltage has $\pm 3.6\text{V}$ tolerance.
2. The emphasised value with bold font showed at forward current means the DC forward current value.

Wattage (W)	Color	Typ. Luminous Flux(lm) T _j =85°C	Typ. Luminous Flux(lm) T _j =25°C	Typ. Forward Voltage V _F (V)	Forward Current (mA)	Order Code
16-24W	2700K	1360	1560	37.2	360	2PHM16WW27P13001
		2325	2670	40.3	720	
	3000K	1400	1605	37.2	360	
		2395	2750	40.3	720	
	3500K	1430	1640	37.2	360	2PHM16NW27P13001
		2460	2825	40.3	720	
	4000K	1455	1670	37.2	360	
		2525	2900	40.3	720	
	5000K	1450	1665	37.2	360	2PHM16CW27P13001
		2490	2860	40.3	720	
	5700K	1445	1660	37.2	360	
		2455	2820	40.3	720	
30-60W	2700K	1450	1665	37.2	360	2PHM16CW27P13001
		2475	2840	40.3	720	
	2700K	2510	2880	37.2	720	2PHM30WW27P13001
		4145	4760	40.3	1440	
	3000K	2675	3070	37.2	720	
		4265	4900	40.3	1440	
	3500K	2725	3130	37.2	720	2PHM30NW27P13001
		4570	5250	40.3	1440	
	4000K	2775	3190	37.2	720	
		4875	5600	40.3	1440	
	5000K	2775	3185	37.2	720	2PHM30CW27P13001
		4745	5450	40.3	1440	
	5700K	2770	3180	37.2	720	
		4615	5300	40.3	1440	
	6500K	2775	3190	37.2	720	
		4700	5400	40.3	1440	

Notes:

1. Forward Voltage has $\pm 3.6V$ tolerance.
2. The emphasised value with bold font showed at forward current means the DC forward current value.

Wattage (W)	Color	Typ. Luminous Flux(lm) T _j =85°C	Typ. Luminous Flux(lm) T _j =25°C	Typ. Forward Voltage V _F (V)	Forward Current (mA)	Order Code
40-80W	2700K	4350	5000	37.2	1080	2PHM40WW27P16001
		7535	8660	40.3	2160	
	3000K	4485	5150	37.2	1080	
		7675	8820	40.3	2160	
	3500K	4585	5270	37.2	1080	
		7660	8800	40.3	2160	
	4000K	4690	5390	37.2	1080	2PHM40NW27P16001
		7660	8800	40.3	2160	
	5000K	4735	5440	37.2	1080	2PHM40CW27P16001
		7965	9150	40.3	2160	
	5700K	4780	5490	37.2	1080	
		8265	9495	40.3	2160	
	6500K	4785	5500	37.2	1080	
		8310	9550	40.3	2160	

Notes:

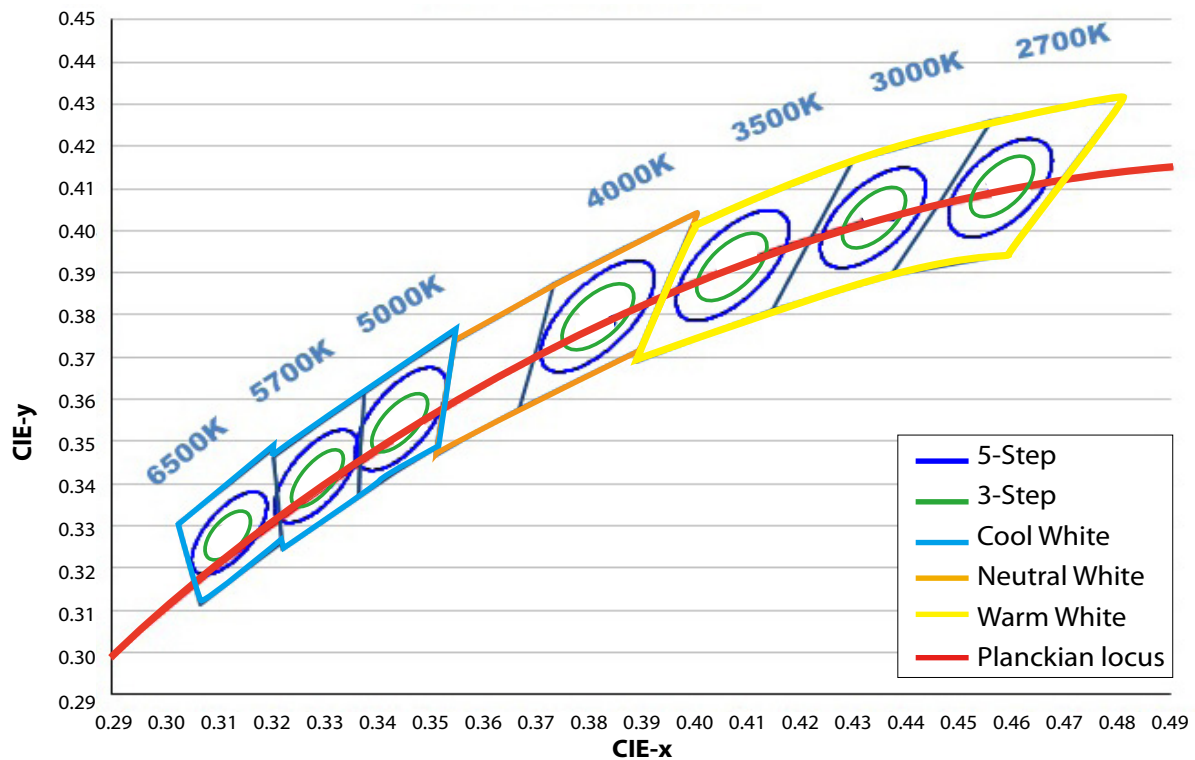
1. Forward Voltage has $\pm 3.6V$ tolerance.
2. The emphasised value with bold font showed at forward current means the DC forward current value.

Chromaticity coordinates($T_c=85^{\circ}\text{C}$)

Color region stay within Macadam "3-Step/5-step" ellipse from the chromaticity center.

The chromaticity center refers to ANSI C78.377:2008.

Please refer to ANSI C78.377 for the chromaticity center.

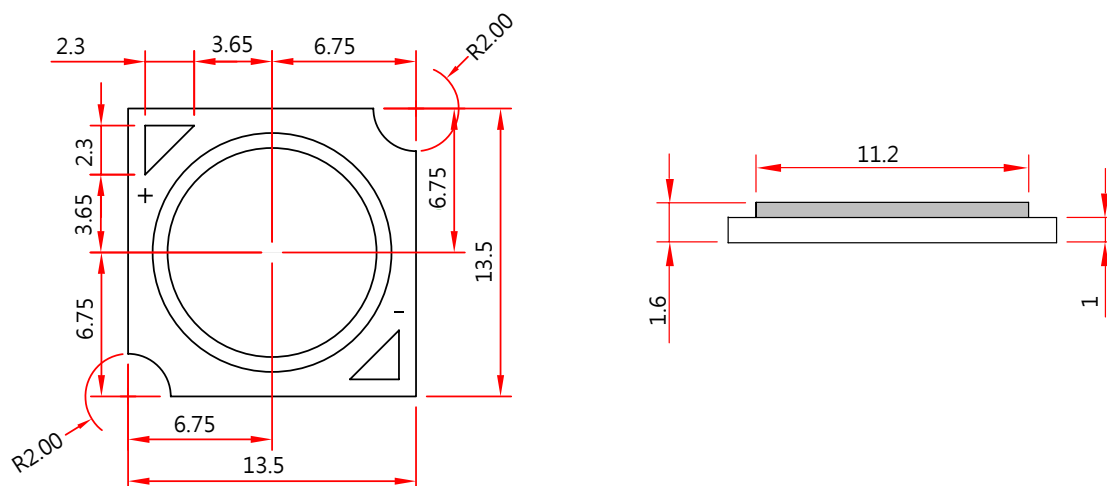


CCT	Steps	Cx	Cy	a	b	theta
2700K	5	0.4578	0.4101	0.01350	0.00700	53.7
3000K	5	0.4338	0.4030	0.01390	0.00680	53.22
3500K	5	0.4073	0.3917	0.01545	0.00690	54
4000K	5	0.3818	0.3797	0.01565	0.00670	53.72
5000K	5	0.3447	0.3553	0.01370	0.00590	59.62
5700K	5	0.3287	0.3417	0.01243	0.00533	59.09
6500K	5	0.3123	0.3282	0.01115	0.00475	58.57

CCT	Steps	Cx	Cy	a	b	theta
2700K	3	0.4578	0.4101	0.00810	0.00420	53.7
3000K	3	0.4338	0.4030	0.00834	0.00408	53.22
3500K	3	0.4073	0.3917	0.00927	0.00414	54
4000K	3	0.3818	0.3797	0.00939	0.00402	53.72
5000K	3	0.3447	0.3553	0.00822	0.00354	59.62
5700K	3	0.3287	0.3417	0.00746	0.00320	59.09
6500K	3	0.3123	0.3282	0.00669	0.00285	58.57

Mechanical Dimensions

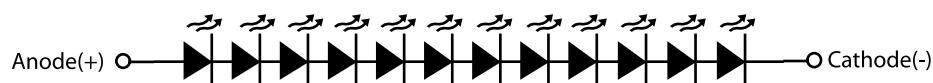
5W/ 9W Emitter Dimensions



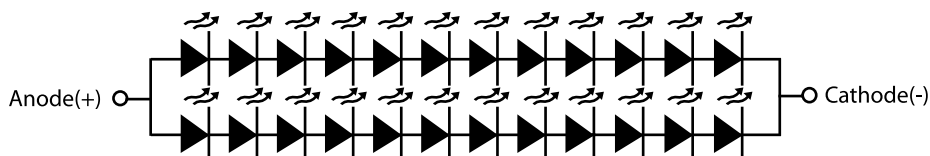
Notes :

1. Unit : mm
2. Tolerance : ± 0.2 mm
3. Drawings are not to scale
4. T_p : Thermal measurement point

5W/ 9W Emitter Circuit Layout

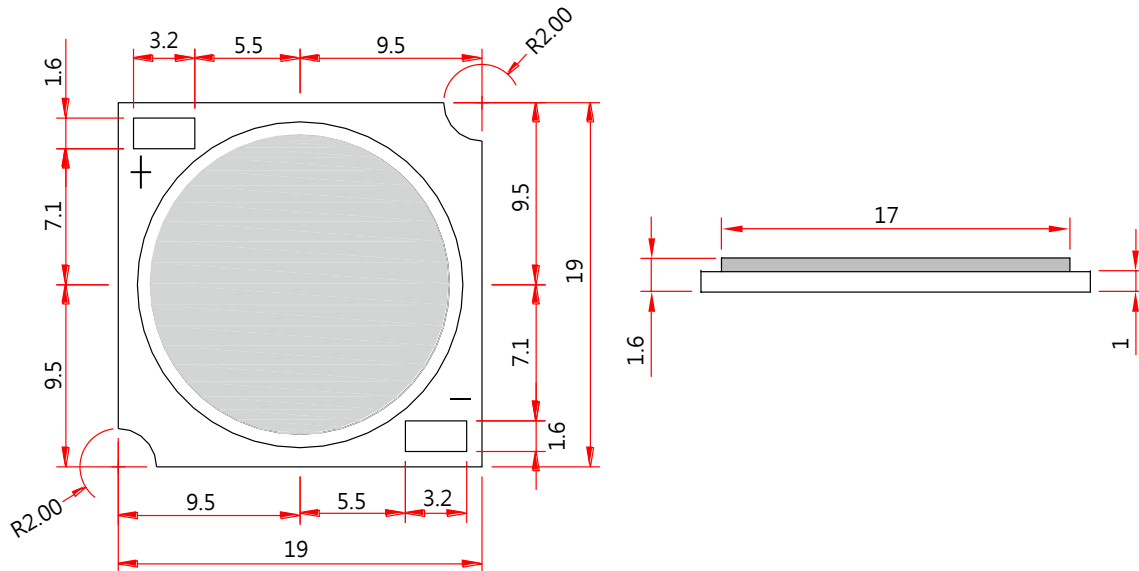


5W EdiPower® II HM Series Circuit Layout



9W EdiPower® II HM Series Circuit Layout

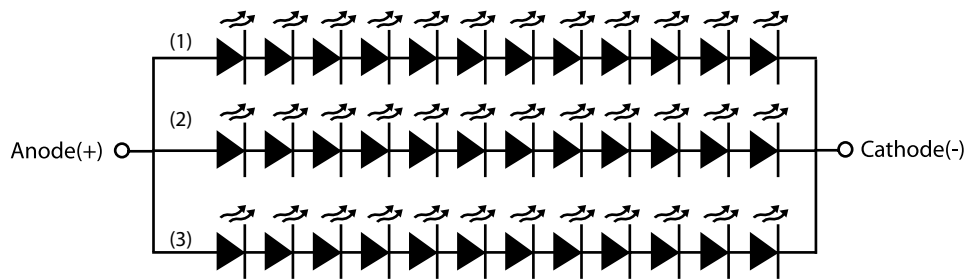
16W/ 30W Emitter Dimensions



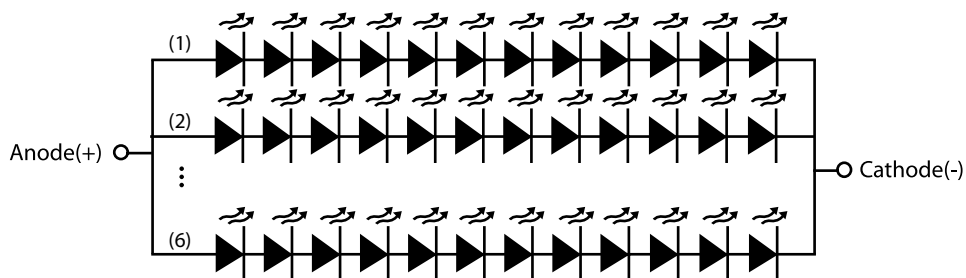
Notes :

1. Unit : mm
2. Tolerance : ± 0.2 mm
3. Drawings are not to scale
4. T_p : Thermal measurement point

16W/ 30W Emitter Circuit Layout

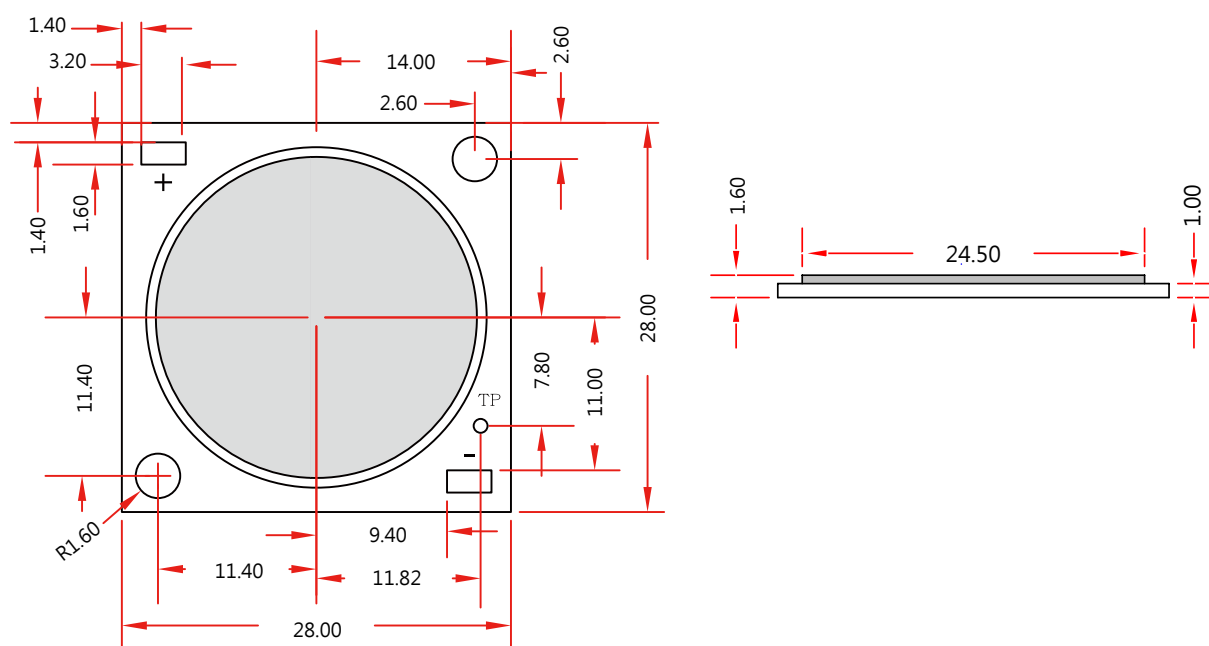


16W EdiPower® II HM Series Circuit Layout



30W EdiPower® II HM Series Circuit Layout

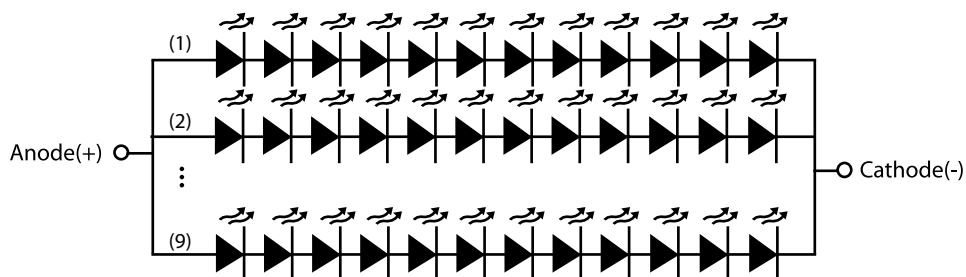
40W Emitter Dimensions



Notes :

1. Unit : mm
2. Tolerance : ± 0.2 mm
3. Drawings are not to scale
4. T_p : Thermal measurement point

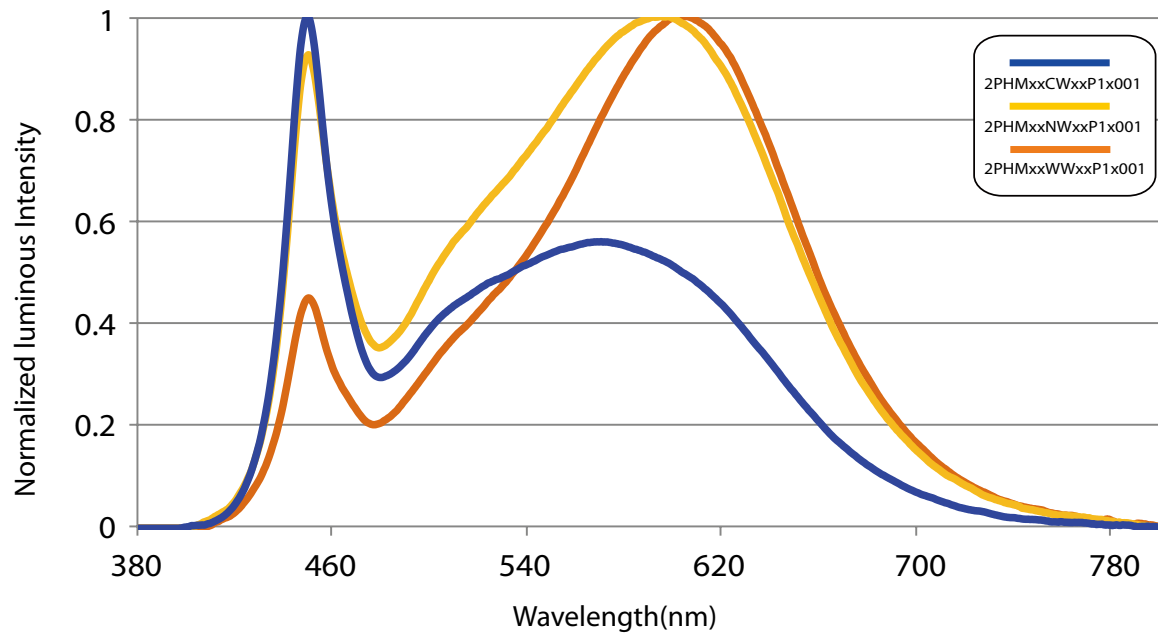
40W Emitter Circuit Layout



40W EdiPower® II HM Series Circuit Layout

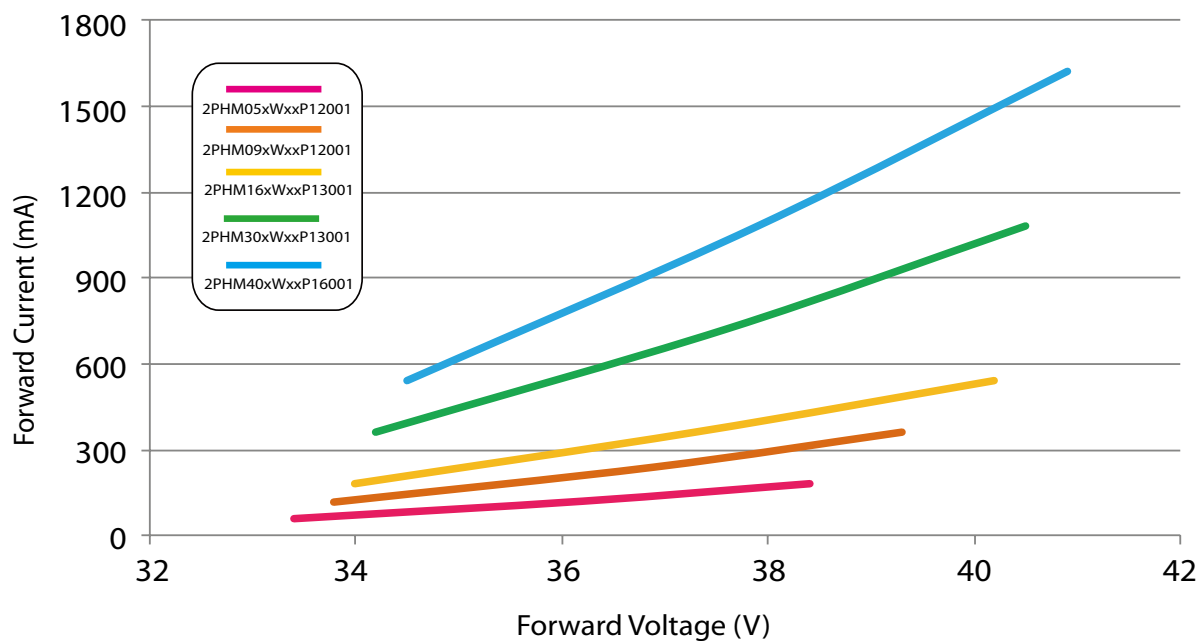
Characteristic curve

Color Spectrum



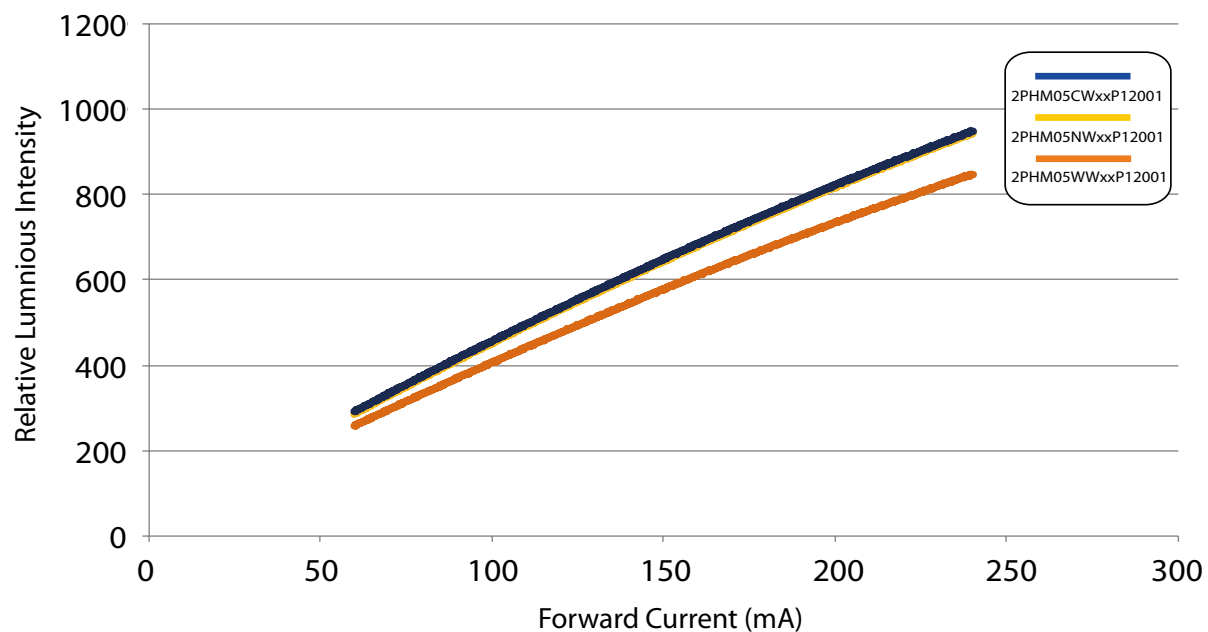
Color Spectrum at a typical CCT for EdiPower® II HM series

Forward Current vs. Forward Voltage



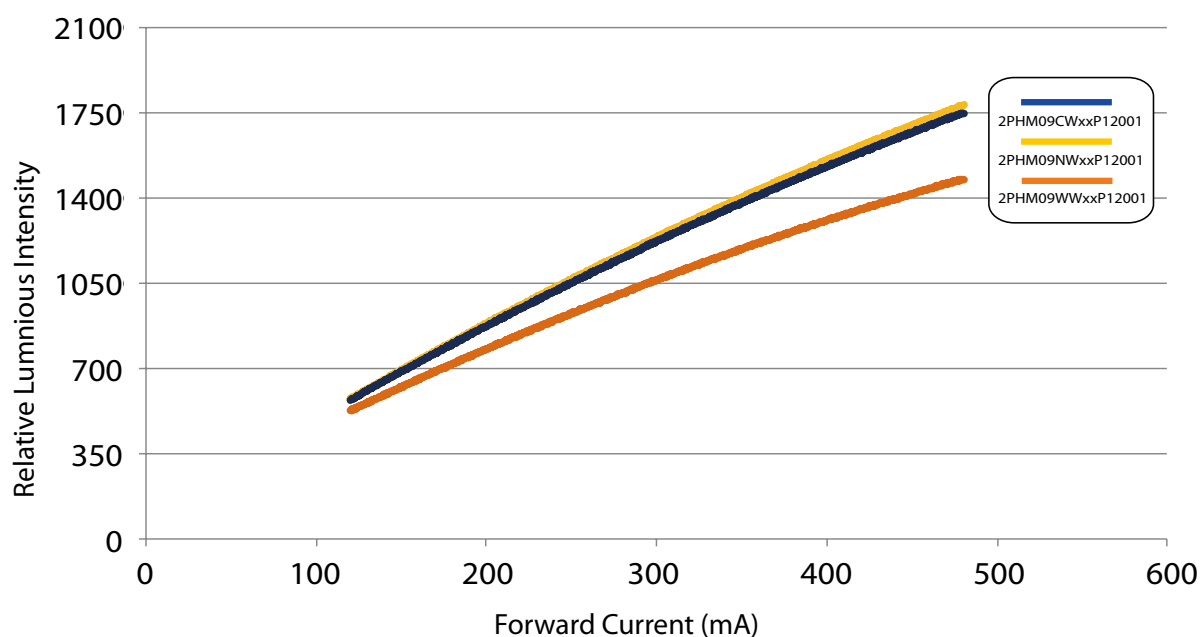
Forward Current vs. Forward Voltage for EdiPower® II HM series

Relative Intensity vs. Forward Current (5W)



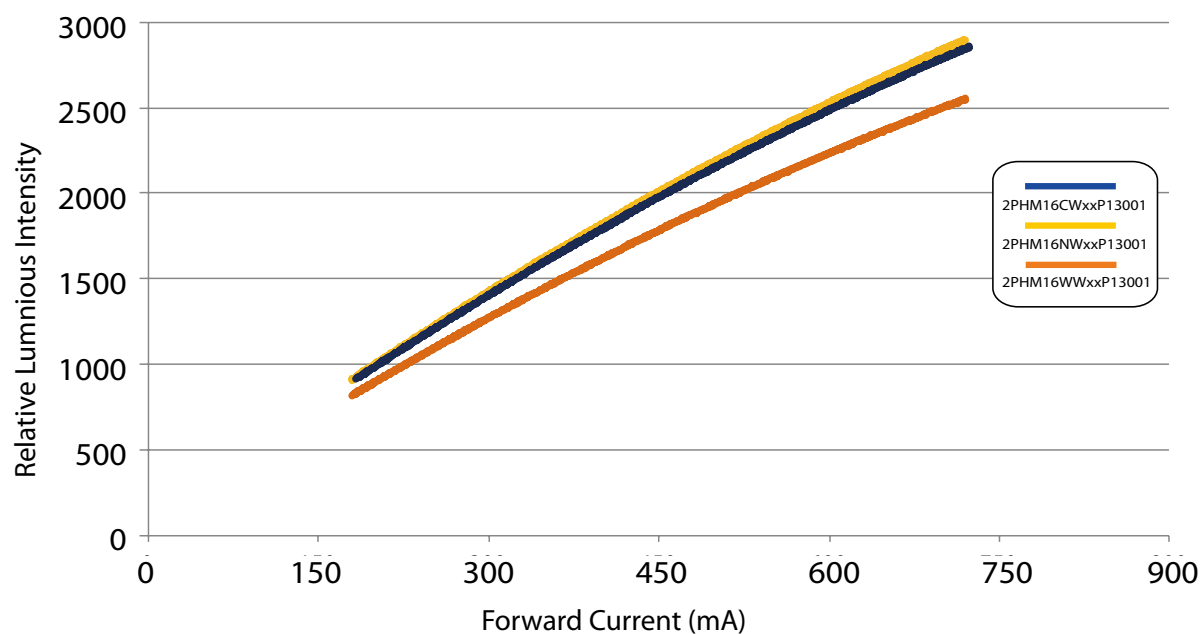
Forward Current vs. Luminous Intensity for EdiPower® II HM 5W series

Relative Intensity vs. Forward Current (9W)



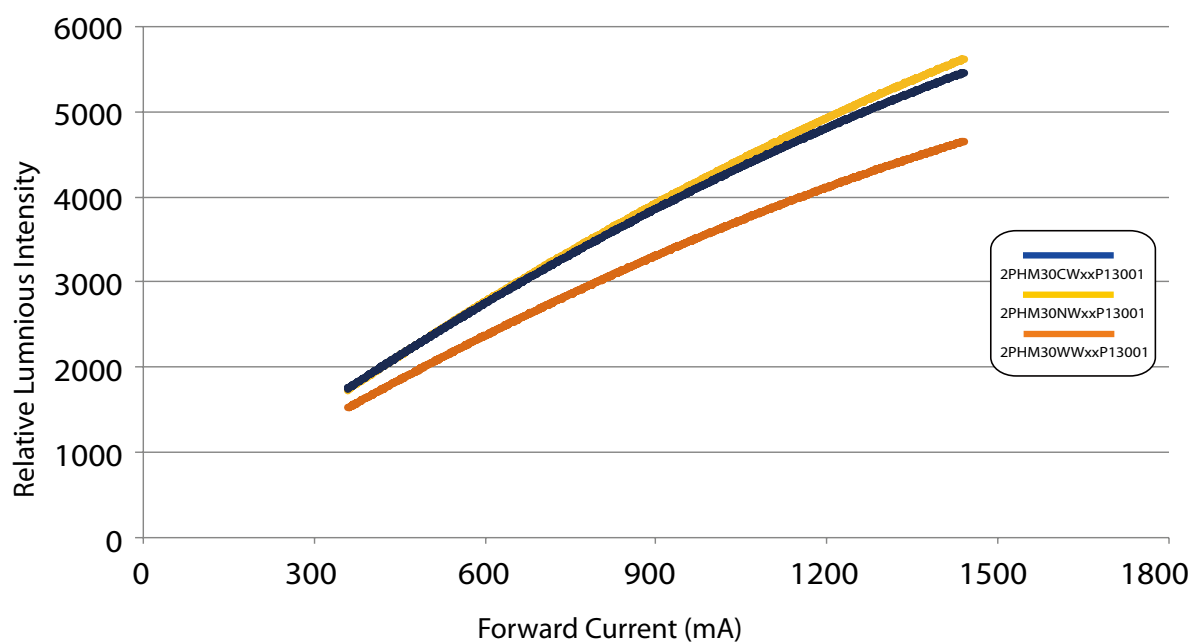
Forward Current vs. Luminous Intensity for EdiPower® II HM 9W series

Relative Intensity vs. Forward Current (16W)



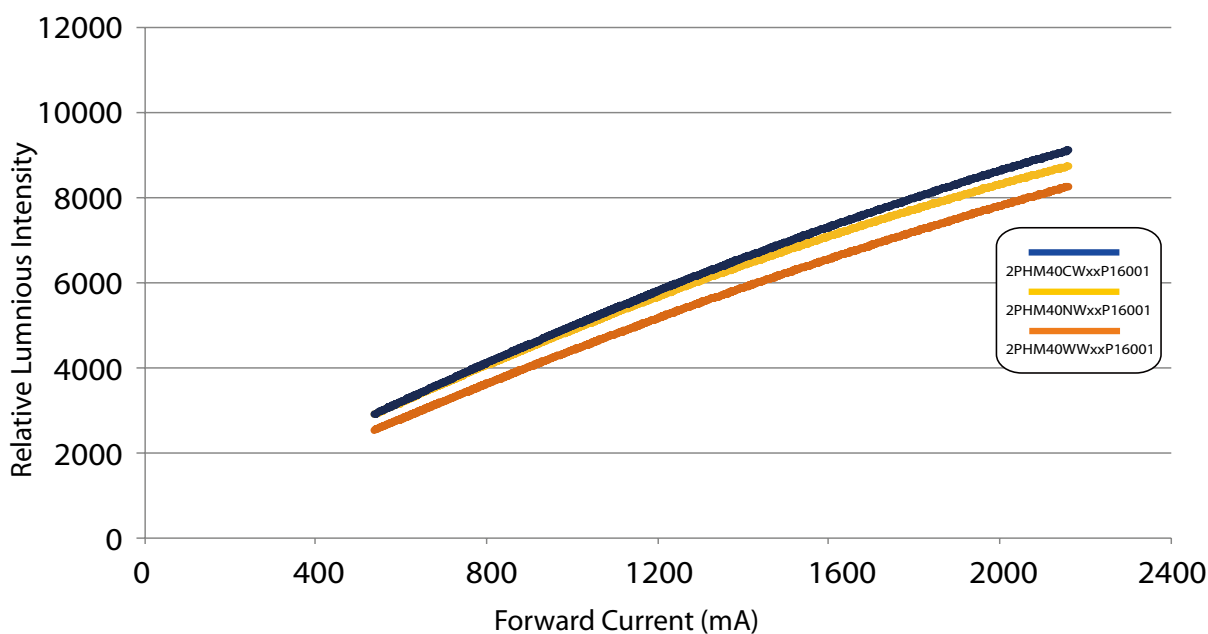
Forward Current vs. Luminous Intensity for EdiPower® II HM 16W series

Relative Intensity vs. Forward Current (30W)



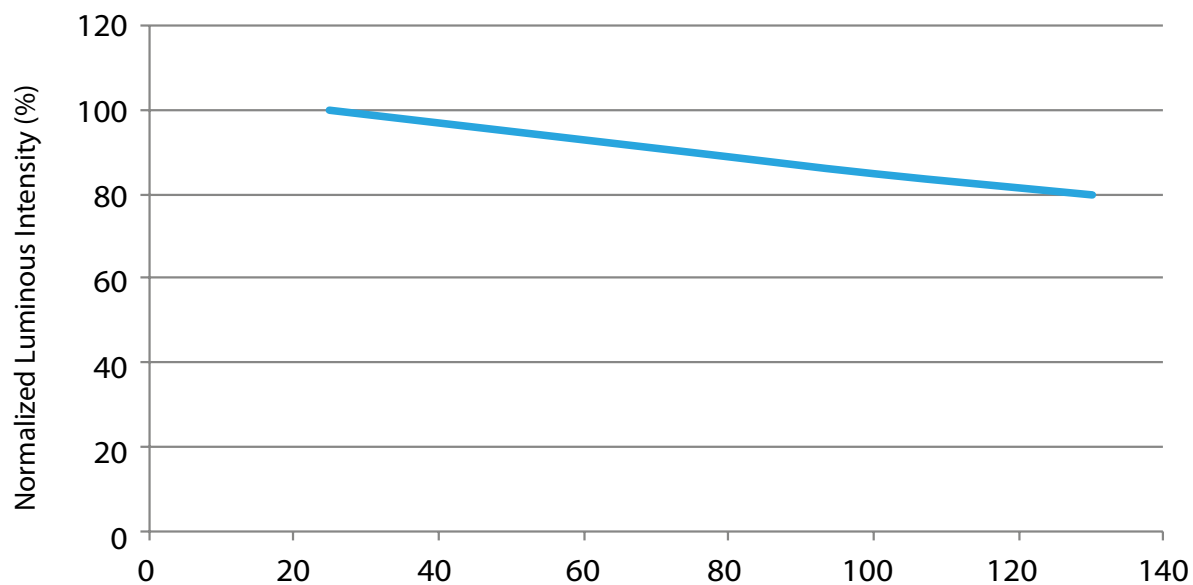
Forward Current vs. Luminous Intensity for EdiPower® II HM 30W series

Relative Intensity vs. Forward Current (40W)



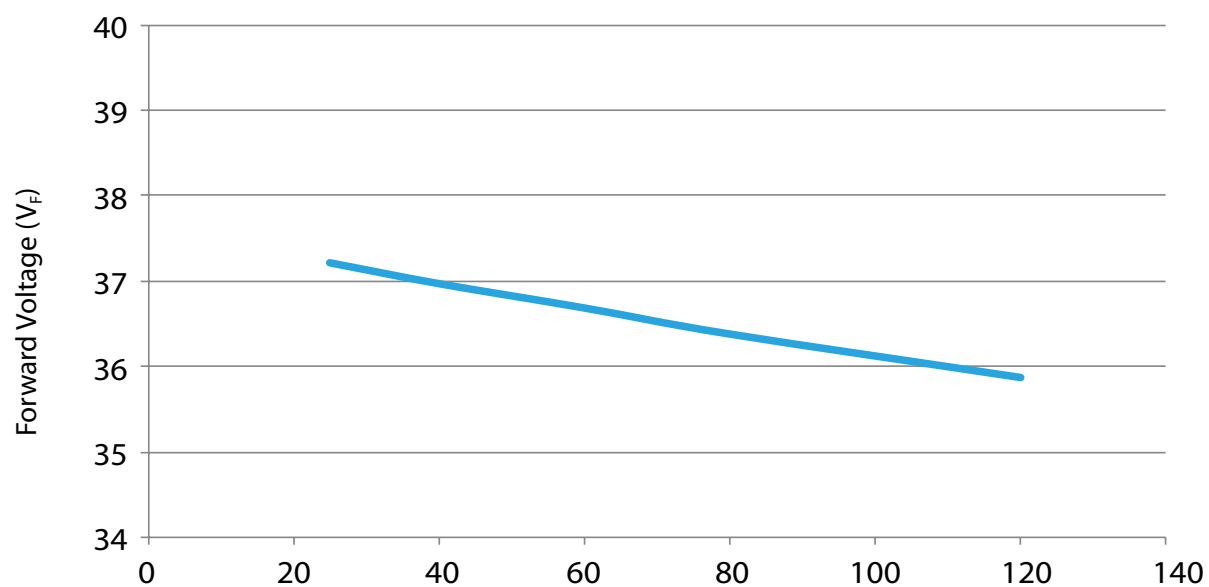
Forward Current vs. Luminous Intensity for EdiPower® II HM 40W series

Luminous Flux vs. Junction Temperature



Junction Temperature (°C)
Luminous flux vs. junction temperature for HM series

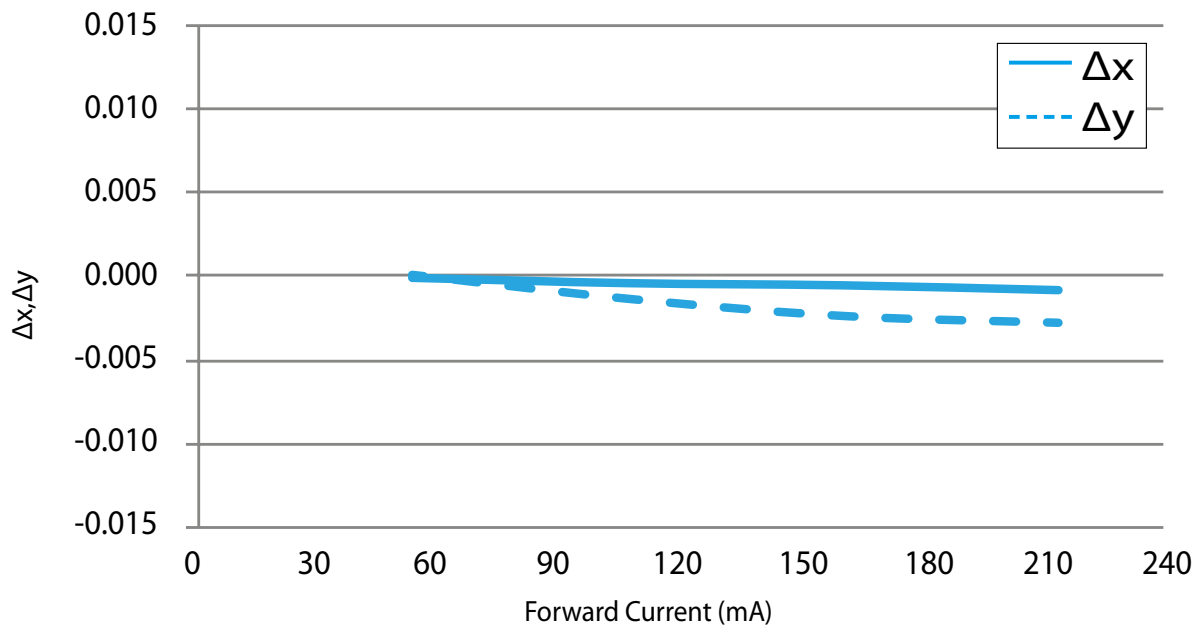
Forward Voltage vs. Junction Temperature



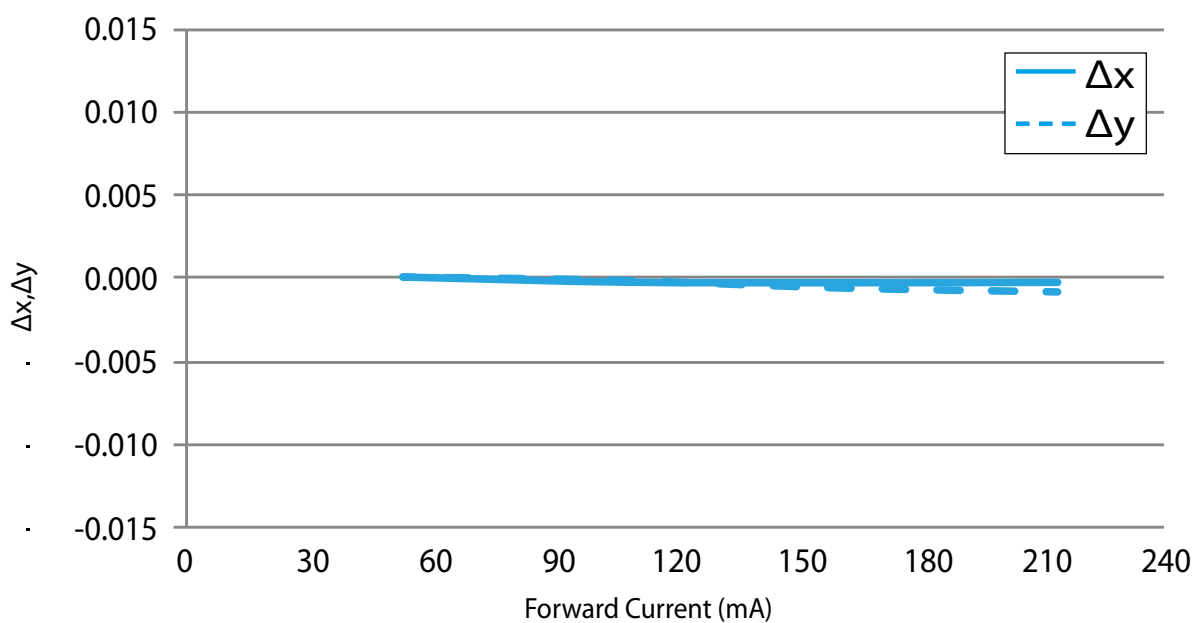
Junction Temperature (°C)
Forward voltage vs. junction temperature for HM series

The trend of $\Delta x, \Delta y$ vs. Forward Current characteristic curve 2PHM09xW27P12001, 2PHM16xW27P13001, 2PHM30xW27P13001, 2PHM40xW27P16001 resemble curve 2PHM05xW27P12001

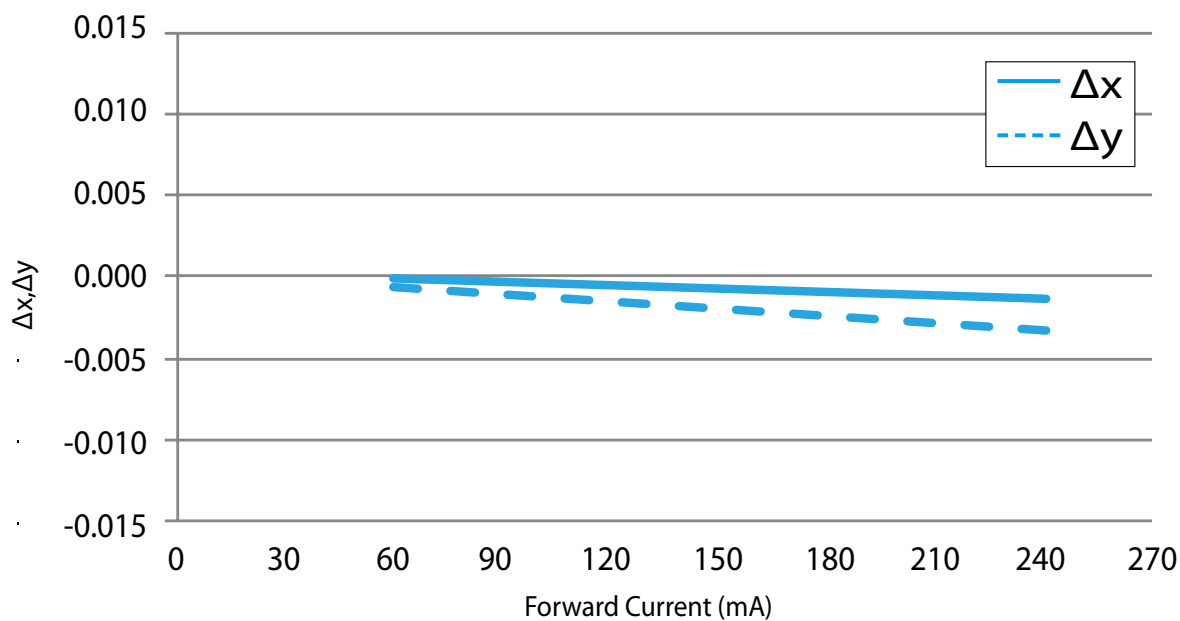
$\Delta x, \Delta y$ vs. Forward Current



$\Delta x, \Delta y$ vs. Forward Current for 2PHM05CW27P12001

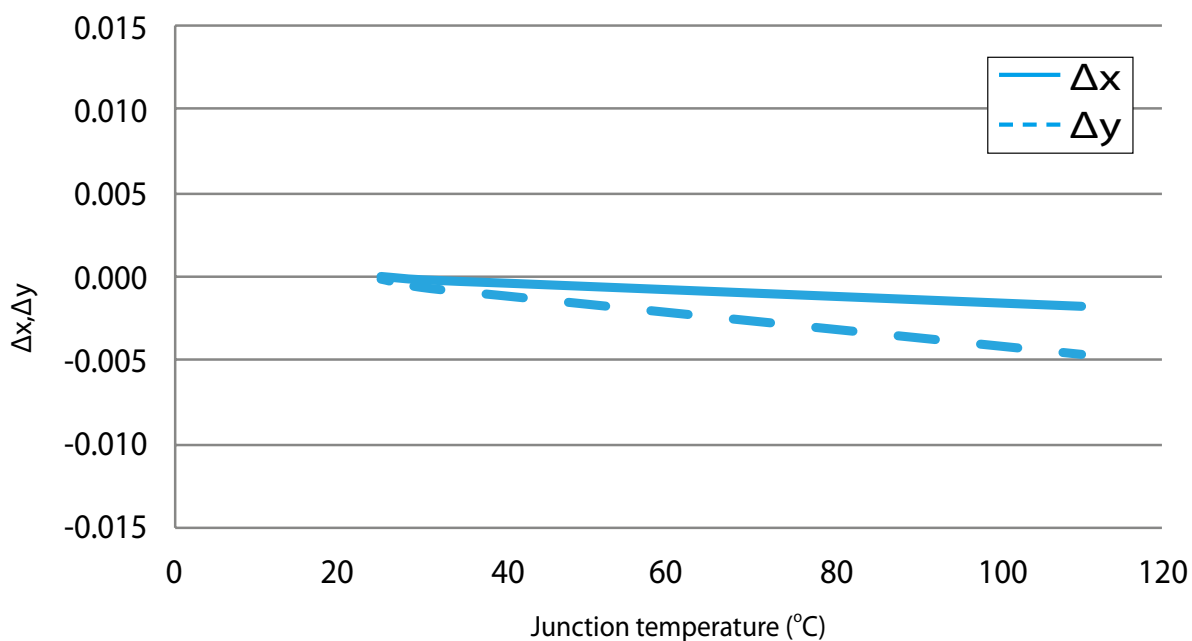


$\Delta x, \Delta y$ vs. Forward Current for 2PHM05NW27P12001

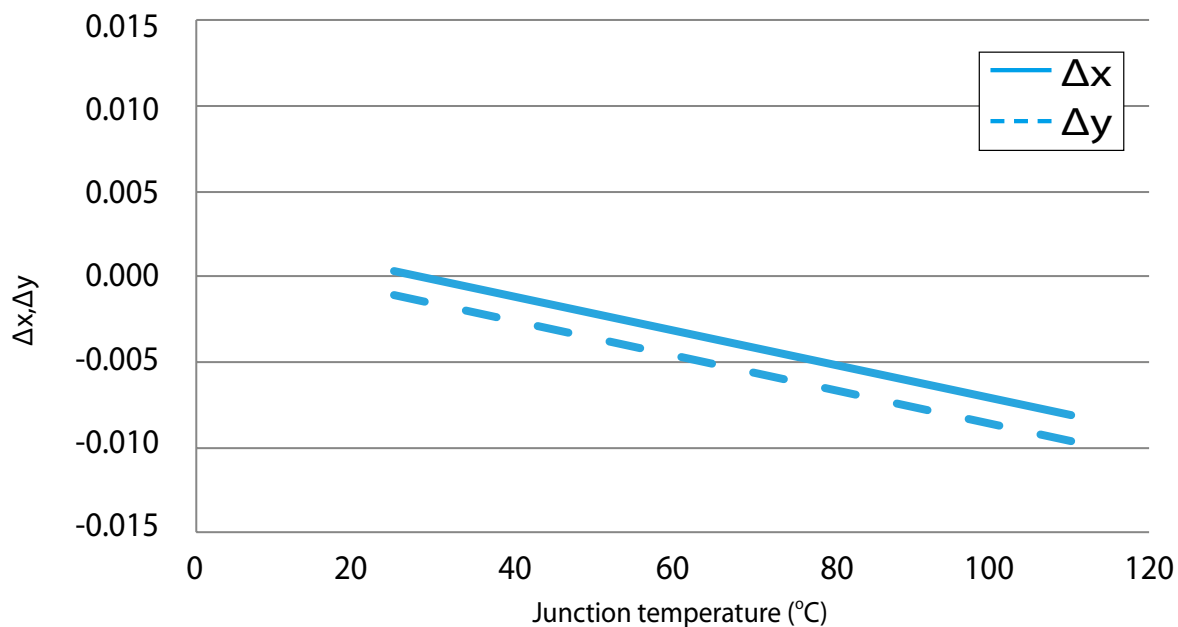


Δx,Δy vs. Forward Current for 2PHM05WW27P12001

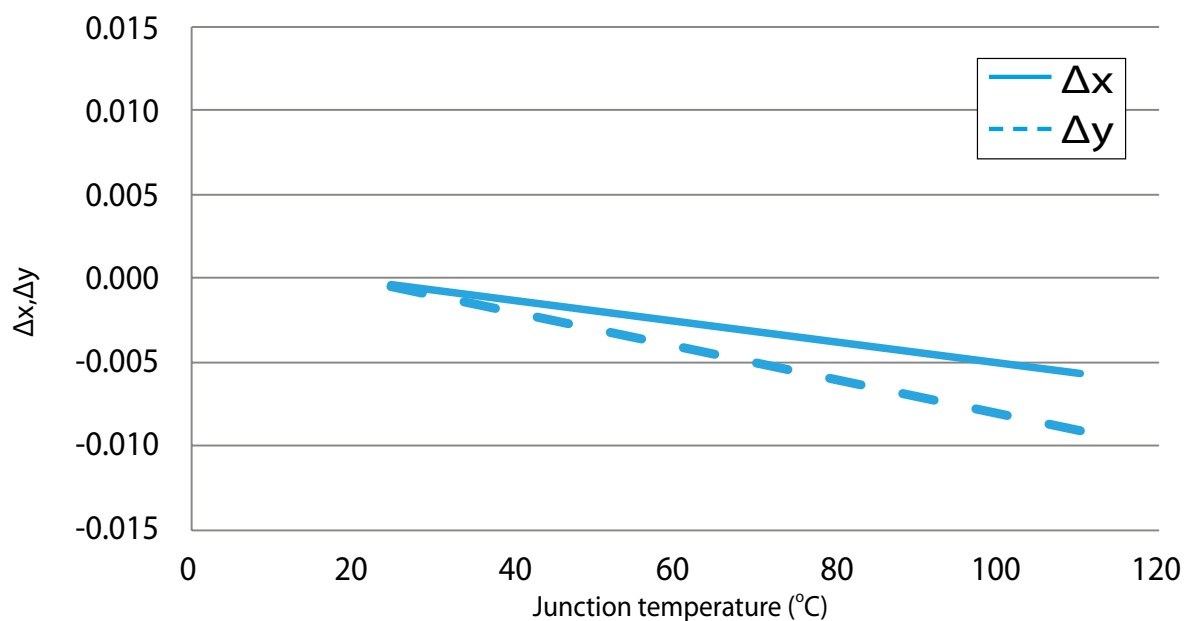
Δx,Δy vs. Junction Temperature



Δx,Δy vs. Junction temperature for 2PHMxxCW27P1x001



Δx,Δy vs. Junction temperature for 2PHMxxNW27P1x001



Δx,Δy vs. Junction temperature for 2PHMxxWW27P1x001

Reliability

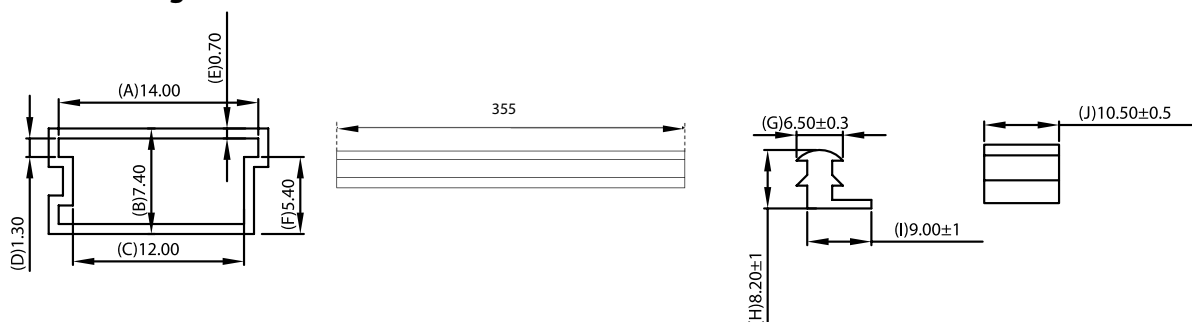
NO .	Test Item	Test Condition	Remark
1	Temperature Cycle	-40°C~100°C 30, 30, mins	100 Cycle
2	Thermal Shock	-40°C~100°C 15, 15 mins $\leq$ 10 sec	100 Cycle
3	Moisture Resistance	25°C~65°C 90% RH 24 hrs / 1 cycle	10 Cycle
4	High-Temperature Storage	T _A =100°C	1,000 hrs
5	Humidity Heat Storage	T _A =85°C RH=85%	1,000 hrs
6	Low-Temperature Storage	T _A =-40°C	1,000 hrs
7	Operation Life test	25°C	6,000 hrs
8	High Temperature Operation Life test	85°C	1,000 hrs
9	High Humidity Heat Life Test	85°C, 85%RH	1,000 hrs
10	ON/OFF Test	3 sec ON, 3 sec OFF	10W times

Failure Criteria

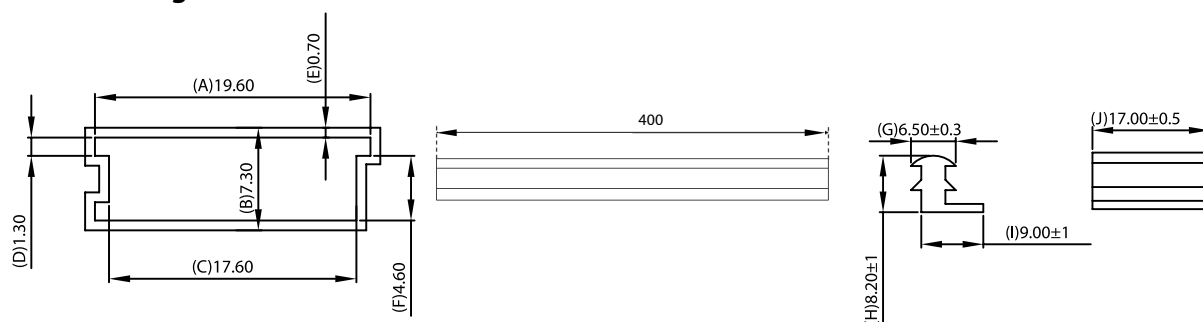
Item	Criteria for Judgment	
	Min.	Max.
Lumen Maintenance	85%	-
$\Delta u'v'$	-	0.006
Forward Voltage	-	Initial Data x 1.1
Reverse Current	-	10 μ A
Resistance to Soldering Heat	No dead lamps or visual damage	

Product Packaging Information

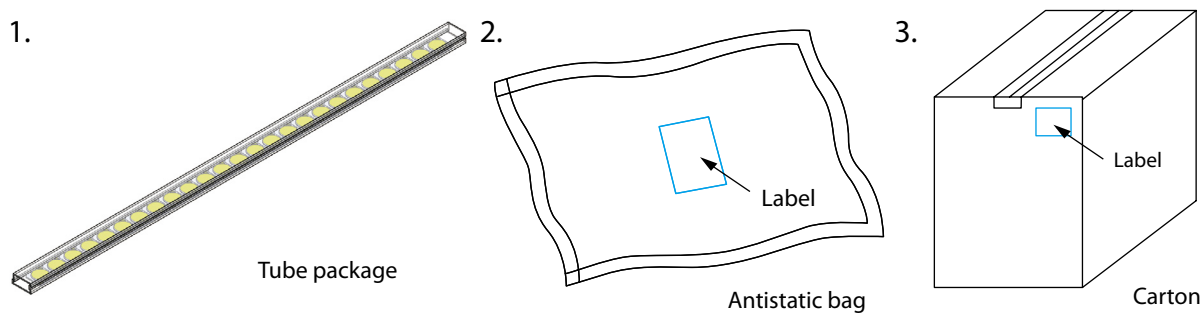
Tube Packing for 5/ 9 W



Tube Packing for 16/ 30W



Tube package dimension.

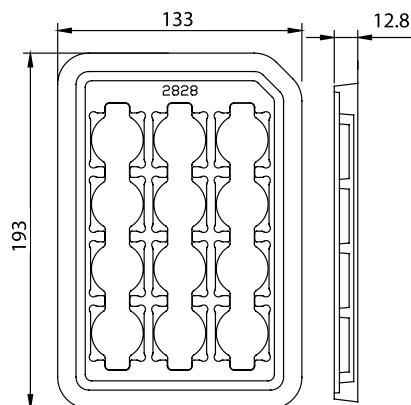


Packaging items for HM Series

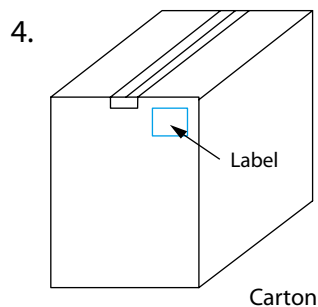
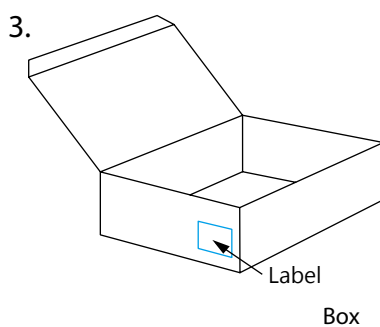
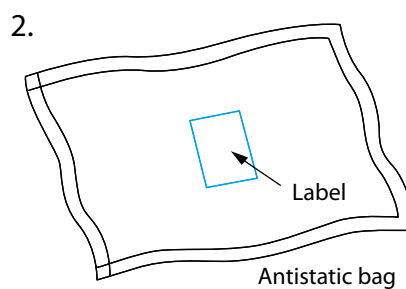
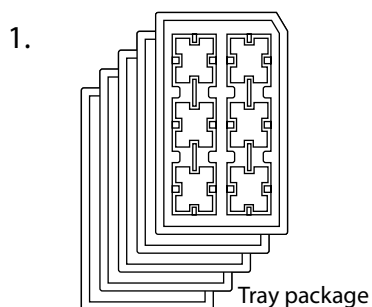
Notes:

1. All dimensions are in mm.
2. 5W/9W: 25pcs emitters in a full tube
16W/30W: 20pcs emitters in a full tube.
3. There are 20 tubes in a bag.
4. 5W/9W: 6 bags in a carton
16W/30W: 4 bags in a carton.
5. A bag contains one humidity indicator card and drying agent.

Tray Packing for 40W



Tray package dimension.



Packaging items for HM Series

Notes:

1. All dimensions are in mm.
2. There are 40W 12pcs emitters in a full tray.
3. There are 5 trays in a bag.
4. There are 10 bags in a box.
5. There are 10 boxes in a carton.
6. A bag contains one humidity indicator card and drying agent.

Revision History

Versions	Description	Release Date
1	Establish order code information	2013/12/17
2	1. Add 5W and 16W information 2. Add characteristic curve	2013/05/20
3	Update the Characteristic Curve	2013/06/24
4	1. Add the Characteristic curve & Tray Packing 2. Update the luminous flux characteristic 3. Add Average Lumen Maintenance Characteristics 4. Update Mechanical Dimensions 5. Add the Chromaticity coordinates	2013/10/02
5	1. Delete Bin Range of Chromaticity Coordinates 2. Update Luminous Flux Characteristic 3. Add the Limited Warranty	2013/10/08
6	1. Add and enlarge all Characteristic Curve 2. Revise Luminous Flux Characteristic&package information	2013/12/23
7	1. Revise Reliability 2. Update Luminous Flux Characteristic 3. Update 5W/9W, 40W Emitter Dimension	2014/02/10
8	1. Update product packaging information 2. Update Characteristic Curve	2014/03/07
9	1. Update Junction temperature 2. Revise Luminous flux characteristic	2014/04/08

About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at www.edison-opto.com

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